Antecedents and consequences of social networking site knowledge sharing by seniors

A social capital perspective

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Abstract

Purpose – Understanding elders' experience and knowledge-sharing behaviors online have become significant issues in this aging society. In this study, the purpose of this paper is to summarize and validate the factors that influence the intention of elders to share knowledge online, and assess whether seniors' knowledge-sharing behaviors affect their sense of meaning in life.

Design/methodology/approach – In total, 49 senior students were invited as participants to join the social networking site (SNS) and share knowledge on the platform. After a month of knowledge-sharing activities, questionnaires were distributed to all the participants. All the 49 participants returned completed questionnaires. To verify the results obtained via the above quantitative data analysis, follow-up interviews were conducted with one popular computer instructor and four seniors (who are experienced users of the SNS). Open-ended questions were employed to understand the motivations for sharing knowledge in a virtual community and the benefits obtained from sharing.

Findings – The results indicate that sharing vision, community identification, and social interaction ties are the main factors that influence the sharing of knowledge by seniors on SNSs. In addition, sharing knowledge on SNSs has a positive influence on seniors' meaning in life. Follow-up interviews conducted also validate the results obtained.

Originality/value – Understanding elders' experience and knowledge-sharing behaviors online have become significant issues in this aging society. It can not only benefit younger generations but also enable them to age gracefully. Rare SNSs similar to the one used in the study were found on the Facebook during our research.

Keywords Social capital, Knowledge sharing, Seniors, Social networking sites, Elderly people, Meaning in life

Paper type Research paper

1. Introduction

Continuous advancements in medical technology and improvements in health maintenance have resulted in an extension of the national average lifespan in Taiwan. The number of people aged 65 years or older exceeded 2.5 million in August 2011, accounting for 10.78 percent of the total population. It is projected that this proportion will increase to approximately one-third of the national population by 2026 (Statistics Department of the Ministry of the Interior, 2010).

With the increase in average life expectancy and technology advancement, retired people can expect a substantial amount of leisure time, in contract to life in the agricultural age. Though seniors have work experience, specific knowledge and expertise, and have been productive throughout their lives, this is generally ignored by society (Warburton and Grassman, 2011). Nevertheless, seniors should value their own life experiences and play a more active role as mentors and guides, rather than passively waiting for services. Several scholars have proposed that seniors have great potential, given their level of mental maturation (Wang *et al.*, 2011). Therefore, the knowledge and wisdom of seniors should be regarded as valuable social capital and, as the society ages, a more advanced understanding of this form of social capital is required. In an aging society, it becomes imperative to help seniors' experience a life full of meaning, achieve self-affirmation, and feel a greater sense of life satisfaction in their later years (Steger *et al.*, 2009). With a sense of individual significance and a clear self-identity, seniors can achieve a state of positive mental health and age gracefully (Charbonneau-Lyons *et al.*, 2002).

To help Taiwan's seniors further pursue their education and participate in social activities, the Ministry of Education proposed the Senior Education Policy to provide a lifelong learning system (White Paper of the Senior Education Policy, 2006). "Active Aging Learning Programs" and "Senior Universities" were established in 368 towns and in various colleges throughout the country to provide this kind of opportunity. The objective of the program is to encourage seniors to participate socially, contributing their wisdom, special knowledge, or experience.

Although seniors' behaviors and information technology requirements differ from those of younger people (Fischer *et al.*, 2014), the pervasiveness of the internet has ensured a continuous increase, in the number of seniors using computers and the internet. Using the internet and social technology can provide older adults with benefits such as high-level social support, more successful relationships, and greater life satisfaction among other things (Heo *et al.*, 2015; Chopik, 2016). However, prior studies have explored the effects of seniors using the internet and social technology without any theoretical basis. Consequently, we propose a framework based on social capital theory to understand the factors that underlie seniors' intention to share their knowledge in the virtual world and the subsequent effects of this desire. Our research questions are as follows:

RQ1. What social capital factors or individual motivations affect seniors' intention to share knowledge on social networking sites (SNSs)?

RQ2. Does seniors' knowledge-sharing behavior on SNSs affect their sense of meaning in life?

2. Literature and theoretical background

2.1 Knowledge-sharing behavior
Knowledge can be measured from several perspectives: as a state of mind, a condition of having access to information, or a capability (Dreske, 1981; Nonaka, 1994; Fahey and Prusak, 1998; Davenport and Prusak, 1998; Alavi and Leidner, 2001). Knowledge has the same quality as non-rivalrous public goods in economics: it is something that is not depleted after being consumed and that others can continue to enjoy (Stewart, 1997). Knowledge sharing refers to the transfer or spread of knowledge through individuals, groups, or organizations (Lee, 2001). Hendriks (1999) further noted that knowledge sharing involves a relationship between two participants: a "knowledge possessor" and a "knowledge receiver." Therefore, knowledge sharing involves mutual behaviors where people repeatedly exchange knowledge (Minbaeva *et al.*, 2010).

Knowledge-sharing behavior is also a type of voluntary service that is regarded as a productive activity. The factors influencing seniors to voluntarily share knowledge can be classified as internal or external (Amabile *et al.*, 1994). Both types exist simultaneously and are not contradictory (Deci and Ryan, 1985). However, senior volunteers in nonprofit organizations emphasize intrinsic rewards over extrinsic rewards (Meier and Stutzer, 2004).

2.2 Social capital theory

Social capital is a term used for capital that is embedded in personal relationships. Nahapiet and Ghoshal (1998) divided social capital into three dimensions: structural, cognitive, and relational. The structural dimension refers to required resources that can be acquired from interpersonal networks formed through social interactions and ties among people (Wasko and Faraj, 2005). Having a strong ability to acquire information and use resources enables people to achieve their goals (Coleman, 1990). This study inferred "social interaction ties" from the structural dimension.

"Cognitive social capital" refers to individuals coming from disparate or similar backgrounds and enjoying common goals (Wasko and Faraj, 2005). Such individuals produce or create languages or vocabularies that are helpful for mutual understanding or communication. Through these shared symbols, group members can share their mutual mental schemata to reduce the barriers of communication and achieve consensus. This study inferred "shared vision" from the cognitive dimension. Members of an organization who more closely share the version of the organization increase their communication and have fewer misunderstandings in their interactions with other members (Tsai and Ghoshal, 1998).

"Relational social capital" is primarily used to explain relationships based on long-term interpersonal communication and interactions (Granovetter, 1973; Wasko and Faraj, 2005). In this type of relationship, group members not only have a strong sense of identification, but also regard themselves as a part of the organization and are willing to believe other members of the group (Lewicki and Bunker, 1996). Furthermore, they participate actively in the organization and abide by its communal norms (Putnam, 1995). Nahapiet and Ghoshal (1998) embodied this concept as trust, norms, obligations, and identifications that can be easily measured as the relational dimension of social capital. This study inferred "community identification" from the relational dimension. When a group has a higher sense of identification, cooperation is more frequent and more opportunities exist for knowledge exchange (Lewicki and Bunker, 1996; Nahapiet and Ghoshal, 1998). The intensity of social interaction and connection is a combination of time, affection, and degree of closeness (Granovetter, 1973), and such connections affect the opportunities for group members to exchange knowledge with each other (Nahapiet and Ghoshal, 1998). Kim *et al.* (2016) found that, for older adults using virtual communities, social capital directly affects seniors' attachment and loyalty to SNSs.

2.3 Relationship between social capital and knowledge sharing

The positive relationship between social capital and knowledge-sharing behaviors on SNSs has been validated by previous studies in the context of younger people (Chiu *et al.*, 2006; Chang and Chuang, 2011). Meanwhile, business/organization employees (Wasko and Faraj, 2005; Hau and Kang, 2016) may share more knowledge to acquire better interpersonal relationships (Bock *et al.*, 2006), and volunteers (Meier and Stutzer, 2004) are often motivated to expand their social networks. Hsu and Lin (2008) also mentioned that bloggers continue to share knowledge because they expect to meet new friends on the internet. From the perspective of social exchange, Yan *et al.* (2016) confirmed that social support plays a critical role in knowledge sharing in online health communities.

In the described studies, social capital theory has been used to investigate how young people and employees (rather than seniors) share knowledge on SNSs. However, studies investigating the impact of knowledge sharing on seniors' sense of meaning in life are relatively rare.

3. Materials and methods

Based on the literature and our chosen theoretical background we developed a framework by which to discuss the factors that influence seniors to share knowledge, and to assess how this behavior affects their sense of meaning in life. The influencing factors were derived from the perspectives of social capital and individual motivation (Chang and Chuang, 2011). The hypotheses associated with this research model are discussed below.

3.1 Factors related to individual motivations

Meier and Stutzer (2004) stated that the motives of volunteers include the hope of expanding their social networks. Bock *et al.* (2006) proposed that employees may share knowledge within an enterprise to acquire better interpersonal relationships. Hsu and Lin (2008) also mentioned that bloggers continue to share knowledge because they expect to meet new friends on the internet. Consequently, the following hypothesis was proposed:

> *H1.* Seniors' sense of expected relationships may positively affect their knowledge-sharing behaviors on an SNS.

Altruism influences people to share knowledge (Chang and Chuang, 2011). Solving challenging problems is interesting, and helping others may make people feel good about themselves. Friends are willing to contribute their own knowledge on the internet and solve other people's problems (Kollock, 1999; Wasko and Faraj, 2005). Stergios (2001) also noted that the motives of seniors who participate in intergenerational learning in schools involve contributing to society by offering kindness, their experience, and affection. These motives are similar to altruistic behaviors. Fu *et al.* (2017) confirmed this relationship among younger people, indicating that communal incentives (altruism, connection, and group enjoyment) affect knowledge-sharing intention directly. Therefore, we proposed the following hypothesis:

> *H2.* The altruistic personalities of seniors may positively affect their knowledge-sharing behaviors on an SNS.

3.2 Factors related to social capital

Social capital significantly affects knowledge-sharing behavior (Hau and Kang, 2016). Tsai and Ghoshal (1998) suggested that individual members who more closely share the vision of an organization have fewer misunderstandings in their interactions and have increased communication with other members. Furthermore, a shared vision is one of the constructs of social capital (Hau and Kang, 2016). Hau and Kang's study confirmed the positive relationship between shared goals and knowledge-sharing behavior, and this has been corroborated by Chang and Chuang (2011) and Fefebvre *et al.* (2016), who found that the shared vision and language of community members affects their knowledge-sharing intention. Thus, a third hypothesis was proposed:

> *H3.* Seniors' shared vision with other members of an SNS may positively affect their knowledge-sharing behaviors.

A sense of identification refers to individuals regarding themselves as members of a group, and the degree to which each individual accepts the group's values and standards. It is the main factor affecting the motivation to engage in knowledge integration and exchange. When a group has a greater sense of identification, cooperation is more frequent and more opportunities for knowledge exchange exist (Nahapiet and Ghoshal, 1998; Lewicki and Bunker, 1996). In this paper, the sense of community identification refers to seniors' sense of belonging to their own knowledge-sharing communities, regarding themselves as part of the communities, and having a greater intention to contribute to the communities (Chang and Chuang, 2011). We thus proposed the following hypothesis:

> *H4.* Seniors' sense of community identification may positively affect their knowledge-sharing behaviors on an SNS.

Granovetter (1973) described the intensity level of social interaction and connection as a combination of time, affection, and degree of closeness. Nahapiet and Ghoshal (1998) considered that such connections affect not only the opportunities for exchanging knowledge within groups, but also the values produced through this process. In this study, social interaction and connection (internet link) comprise a channel of information and resources.

Moreover, Hau and Kang (2016) found that social ties positively affect knowledge-sharing behavior. In this study, social interaction and connection include the extent of the relationships, time, and frequency of communication among the members of an SNS. Strong ties among seniors mean that they participate in many exchanges and exhibit sharing behaviors. Studies by Chang and Chuang (2011) and Fefebvre *et al.* (2016) reported similar findings. Consequently, the following hypothesis was proposed:

   H5. Seniors' mutual social interactions and connections may positively affect their knowledge-sharing behaviors on an SNS.

Wirtz (2001) concluded that a sense of meaning in life is an important variable affecting seniors' depression and quality of life. He also indicated that a sense of meaning in life can be obtained through learning, working, and participating in activities, and gaining achievement and recognition from these processes. Similar opinions were also proposed by Jung *et al.* (2017), who indicated that interacting with others through an SNS positively influences people's psychological well-being. Therefore, we proposed that participating in knowledge-sharing communities and engaging in knowledge-sharing activities may positively affect seniors' sense of meaning in life, yielding our sixth hypothesis:

   H6. Seniors' knowledge-sharing behaviors on an SNS have a positive effect on their sense of meaning in life.

The research model facilitating this discussion of the factors influencing seniors' online knowledge-sharing behaviors and subsequent effects is represented in Figure 1.

   This study defined knowledge-sharing behaviors as the actual behaviors that seniors carry out on an SNS, including all actions related to knowledge publishing. To measure the extent of knowledge sharing, we adopted the concepts proposed by Wasko and Faraj (2005) and Chiu *et al.* (2006).
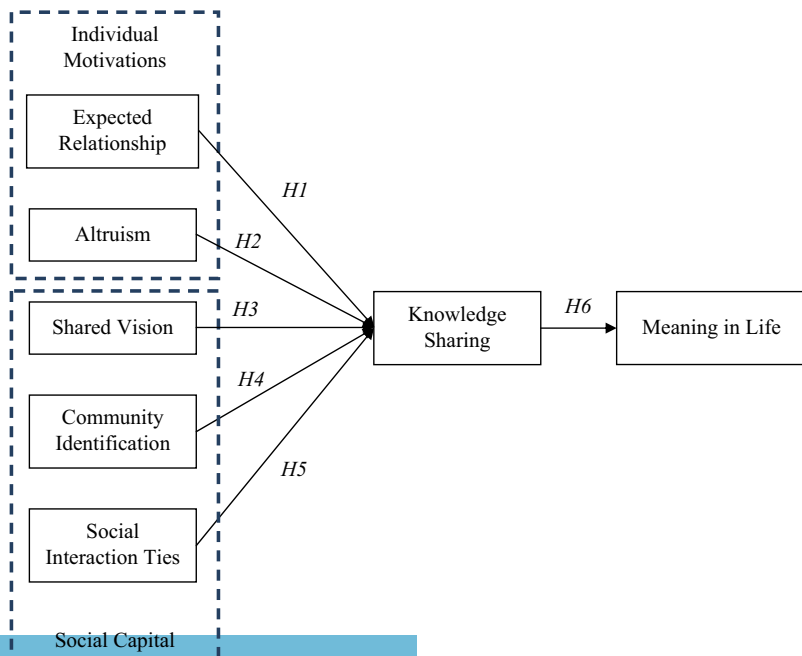

Figure 1.
Research model

Chiayi Senior University (CSU) is accredited as a "First-Class" senior university in Chiayi by Taiwan's Ministry of Education Active Aging Learning Programs. Students from this university were invited to join an SNS and share knowledge on the platform. The senior programs provided by CSU contain a preponderance of computer-related courses and facilities that result in associated students having higher levels of internet literacy. A total of 49 CSU students were invited to join the SNS and share knowledge on the platform. After a month of knowledge-sharing activities, we surveyed the participants on a regular school day in which they came to CSU to attend classes. The authors distributed the questionnaires to the participants, and the survey lasted for half an hour. All 49 participants returned completed questionnaires. The demographic data of these participants are shown in Table I.

4. Results

Based on the guidelines proposed by Gefen *et al.* (2000), this study was oriented toward variance explanation in order to understand knowledge-sharing intention by testing a set of path-specific hypotheses with a small data sample. Therefore, partial least squares (PLS) was suitable for data analysis. Reliability analysis results showed that the values of Cronbach's α were greater than 0.7, which meets the reliability standard proposed by Hair *et al.* (2014). Construct validity is divided into convergent and discriminant reliability. Using PLS to carry out confirmatory factor analysis, we determined that the assessment met all of the standards proposed by Fornell and Larcker (1981). Specifically, the standardized factor loading of each item was greater than 0.5, the composite reliability was greater than 0.8, and the average variance extracted was greater than 0.5. Consequently, the instrument employed in this study was considered valid and reliable. These results are summarized in Table II.

The PLS bootstrapping procedure was used to generate robust results with the small sample size (Zhang *et al.*, 1991). SmartPLS, developed by Ringle *et al.* (2005), and the statistical bootstrap method recommended by Efron and Tibshirani (1993) were used to repeatedly extract 1,000 samples for parameter estimation and inferences. The results of the assessment are shown in Figure 2.

Figure 2 shows the *t*-values derived from the PLS analysis. Three social capital-related factors (shared vision ($p < 0.01$), community identification ($p < 0.05$), and social

Gender	
Male	25 (51%)
Female	24 (49%)
Age	
55-60	16 (33%)
61-65	14 (29%)
66 and up	19 (39%)
Job before retired	
Government	12 (24%)
Business	8 (16%)
Self-employed	1 (2%)
Homemaker	3 (6%)
Others	25 (51%)
SNS using experience	
1 month (in average)	
Major purpose for using SNSs	
Share knowledge	

Table I.
Demographic data of questionnaire participants

Variable	Items	Factor loadings	AVE	Cronbach's α	Composite reliability
Expected relationship	ER_1	0.951	0.8455	0.8971	0.9163
	ER_2	0.954			
Altruism	Al_1	0.932	0.7809	0.8612	0.9144
	Al_2	0.885			
	Al_3	0.832			
Shared vision	SV_1	0.946	0.7905	0.9306	0.9188
	SV_2	0.929			
	SV_3	0.938			
Community identification	CI_1	0.859	0.5328	0.8987	0.9293
	CI_2	0.897			
	CI_3	0.898			
	CI_4	0.848			
Social interaction ties	SIT_1	0.948	0.6955	0.9595	0.9012
	SIT_2	0.957			
	SIT_3	0.926			
	SIT_4	0.947			
Knowledge sharing	KS_1	0.967	0.9354	0.9309	0.9666
	KS_2	0.843			
Meaning in life	MIL_1	0.473	0.7138	0.9308	0.9414
	MIL_2	0.751			
	MIL_3	0.900			
	MIL_4	0.779			
	MIL_5	0.768			
	MIL_6	0.786			
	MIL_7	0.870			
	MIL_8	0.787			
	MIL_9	0.935			

Notes: ER, expected relationship; Al, altruism; SV, shared vision; CI, community identification; SIT, social interaction ties; KS, knowledge sharing; MIL, meaning in life

Table II.
Validity and reliability
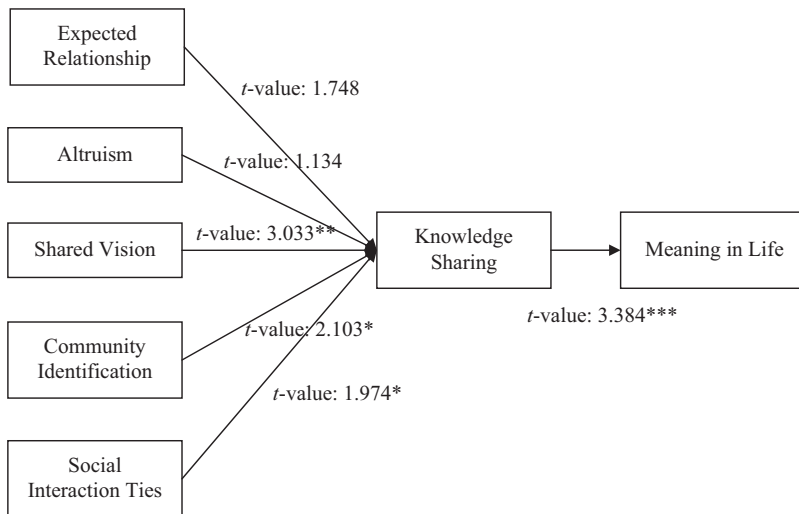
Notes: *$p<0.05$; **$p<0.01$; ***$p<0.001$

Figure 2.
Results of
PLS analysis

interaction ties ($p < 0.05$)) contributed significantly to knowledge-sharing behaviors ($R^2 = 0.904$) and further influenced the sense of meaning in life ($R^2 = 0.217$; $p < 0.001$), whereas the factors of expected relationship and altruism did not. In other words, *H3-H5*, which were related to social capital, were supported. However, *H1* and *H2*, which were related to individual motivations, were not supported. Finally, knowledge sharing significantly contributed to the sense of meaning in life for seniors.

5. Follow-up interview

To verify the results obtained through the preceding quantitative data analysis, follow-up interviews were conducted with one popular computer instructor (who has 8.5 years of senior computer teaching experience and is active in senior community activities) and four seniors (who are experienced users of SNSs). Open-ended questions (Appendix 2) were employed to understand the motivations for sharing knowledge in a virtual community and the benefits obtained from such behavior. The interviews were conducted by the authors, the process was recorded, and the findings were interpreted afterward. The instructor was interviewed for approximately 1.5 hours and the four seniors for nearly two hours. All interviewees had sufficient time to express their opinions. After transcribing the recorded file word for word, the authors performed four steps: critical sentence selection, conceptualization, classification, and construct-building (Cheng *et al.*, 2017). The results of this stage are presented as follows.

The background and demographic information for the four interviewed seniors is summarized in Table III.

The instructor confirmed that shared vision, community identification, and social interaction ties affect seniors' knowledge-sharing behaviors, and that seniors can learn and access new things and acquire knowledge that enriches their life. Furthermore, the instructor observed that personality plays a critical role, as extroverted and enthusiastic people like to share their knowledge on SNSs. Previous studies have indicated that the characteristics of older adults affect their acceptance of technology (Peek *et al.*, 2014). Therefore, we suggest that future studies should incorporate personality to explore this research area in greater depth.

		Interviewees		
	A	B	C	D
Gender				
M			X	X
F	X	X		
Age				
55-60				
61-65	X			X
66 and up		X	X	
Job before retired				
Government			X	
Business		X		
Self-employed				X
Homemaker	X			
SNSs using experience				
Year	4-5	4-5	4-5	4-5
Major purpose for using SNSs				
Contact members	X	X		
Share knowledge	X	X	X	X

Table III.
Demographic data of interviewed seniors

The interviewed elders all indicated that they share their knowledge only with particular private communities, not with the public. Subject C said that sharing knowledge on SNSs is his new life model; it gives him more to do in his everyday life. He likes to share his own creative writing online. In this way, he can increase the amount of interaction with his friends and increase his enjoyment of life. This means that social interaction ties are the major driving factor for him and sharing is helpful for his sense of meaning in life. Subject D emphasized sharing photography on SNSs with his friends. Both Subjects C and D indicated that they tend to share with people who have the same interests on SNSs. Both their own creative products and the knowledge they share are preprocessed before release. Subjects A and B focused on managing their bicycle-riding community. They also share bicycle-related knowledge, riding activities and schedules, and riding experiences. In this way, they foster continuing engagement within their community, with their focus on shared vision, community identification, and social interaction ties.

All subjects recognized both advantages and disadvantages in knowledge sharing on SNSs. These subjects confirmed that, as hypothesized in this study, knowledge sharing can enhance their sense of meaning in life; however, they also stated that too much information could cause information anxiety and overload, which decreases quality of life. Their consensus is that processing (filtering) before sharing results in a positive outcome. This opinion is similar to the conclusion proposed by Peral *et al.* (2015), who indicated that psychological factors affect seniors' use of online social networks. We suggest that future studies should investigate this issue.

6. Discussion and implications

The quantitative and qualitative results show that seniors have common goals and share the SNS vision of engaging in sharing behaviors or actively answering others' questions ($p < 0.01$); this finding corroborates the results obtained by Tsai and Ghoshal (1998). In addition, the members of knowledge-sharing SNSs for seniors have a high sense of identifying and belonging, and are more willing to share knowledge ($p < 0.05$). This is also consistent with the findings of Chiu *et al.* (2006) and Lewicki and Bunker (1996), which indicated that strengthening members' sense of belonging or affection promotes an increase in knowledge exchanges and sharing behaviors within communities. Finally, the seniors' social interactions and connections in knowledge-sharing communities can significantly affect their behaviors in online knowledge-sharing SNSs ($p < 0.05$). This is consistent with the results of Chiu *et al.* (2006), which indicated that strengthening the existing connections among community members also enhances knowledge exchange and sharing behaviors between those members.

The finding of the insignificant influence of seniors' expected relationships within an SNS on their knowledge-sharing behaviors is inconsistent with the study results presented by Hsu and Lin (2008). They found that bloggers would continuously share knowledge on blogs to meet new friends on the internet. Previous studies have also indicated that seniors' main motivation for participating in society is to develop their social networks (Meier and Stutzer, 2004). However, our results show that regardless of whether members' expectations of relationships are high or low, their intention to share knowledge remains the same. Possible reasons for the inconsistency may be that the SNS members participating in this study were from the same class. Therefore, they clicked "Like" and had general interpersonal conversations with each other more frequently than occurs in typical SNS scenarios. Moreover, the participants were new to the SNS, and may have required more time to learn to operate the platform smoothly in order to invite new friends.

The altruistic quality of the members in the knowledge-sharing SNS was observed to have no significant influence on their knowledge-sharing behaviors. This is inconsistent with the conclusions of Wasko and Faraj (2005) that members who enjoy helping others contribute more responses in a setting of one electronic network supporting a professional legal association. Stergios (2001) also noted that altruistic characteristics cause seniors to participate in intergenerational activities and share life experiences, echoing the notion that seniors' life

experience may have accumulated substantial-specific knowledge. In our study, most of the seniors scored high in altruistic qualities (mean: 5.875), but we found that members with relatively low altruistic qualities answered more of others' questions and/or shared knowledge. One possible reason for their participation may be that they wanted to catch up with the training class. Finally, the seniors' knowledge-sharing behaviors in the SNS were observed to have a positive influence on their own sense of meaning in life. This is supported by Wirtz (2001) who showed that gaining achievement and recognition from activities affects seniors' meaning in life.

The majority of knowledge-sharing studies have been based on the general population or specific for-profit organizations. This study confirmed most of the results of prior research (Lewicki and Bunker, 1996; Tsai and Ghoshal, 1998; Nahapiet and Ghoshal, 1998; Chang and Chuang, 2011; Hau and Kang, 2016; Fefebvre *et al.*, 2016). Any inconsistencies may have been caused by the study setting and the fact that the seniors were novices in the use of the SNS. In other words, the factors that influence younger or older people to share knowledge online are alike, but the impact may be different. The sense of meaning in life has rarely been investigated in prior studies because young people or specific for-profit organizations have other more important goals to pursue while sharing knowledge online. For seniors, sharing knowledge online to obtain a sense of meaning in life is a way of staying active while aging. As noted earlier, the experience, specific knowledge, expertise, and productivity seniors have shown throughout their lives have essentially been ignored (Warburton and Grassman, 2011), and yet are valuable social capital. More seniors using SNSs to share knowledge is imperative in an aging society.

7. Limitations and future research
The design of the SNS for seniors used in this study is similar to that of Facebook, and the interface is relatively complicated for those with limited computer experience. Difficulties experienced in using SNSs may reduce seniors' willingness to share knowledge and may also reduce the quality of the knowledge they provide. The on-the-spot observation performed in the knowledge-sharing classes indicated that the keyboard is still quite inconvenient as an input device for seniors. More suitable functions and input tools are required to reduce obstacles in online knowledge-sharing platforms for seniors.

Although the participants were from a senior university with a "First-Class" accreditation, they do not represent the general level of computer/internet literacy for all senior learners in Taiwan. Therefore, future studies should broaden the scope of research to include more diversified samples. Additionally, our research model design is mainly associated with the knowledge-sharing behaviors in virtual communities as cited in the information management field. The model is useful in explaining 90.4 percent of the variation in knowledge sharing but can explain only 21.7 percent of the variation of sense of meaning in life. In other words, important meaning-in-life factors may have been excluded from the research model. Finally, one month of training was provided to ensure that all participants could operate the SNS to share knowledge. Not all of the participants had used Facebook before, so it is possible that the curriculum content or the facilitators of the experiment interfered with the participants' sharing behaviors.

Understanding the knowledge-sharing behavior of elderly people can not only benefit younger generations but also enable seniors to age gracefully. A few SNSs similar to the one used in our study were found during our research. One SNS based in the UK, named "I Don't Feel 50" (IDF50), and the virtual community "senior.com" in the USA were found to be serving the senior community. The members on these two sites had not been acquainted at the start of the network. The content of senior.com is mainly provided by the network manager and classified into six subject areas: finances, health, diet, relationships, and other. However, site participation was in decline for lack of recent updates. The content of IDF50 is provided by members and is classified into categories for health and exercise, traveling, music, games, art, computers, religion, and politics. On average, each member posts 11.2 times per month. Our SNS is relatively new and each member contributes 8.54 times per month; there are also

no specific categories as of yet. In addition, while this study indicates the factors that influence seniors' willingness to share knowledge online, the question of how to motivate them to continue to use SNSs is an important issue to be addressed by future studies.

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Appendix 1. Survey instrument

Variable	Items
ER[c]	1. Sharing my knowledge on KS community would strengthen the tie between other members and me 2. Sharing my knowledge on KS community would create new relationships (Hsu and Lin, 2008)
Al[b]	1. I like helping other people 2. It feels good to help others solve their problems 3. I enjoy helping others in the KS community
SV[a]	1. Members in the KS community share the vision of helping others solve their problems 2. Members in the KS community share the same goal of learning from each other 3. Members in the KS community share the same value that helping others is pleasant
CI[a]	1. I feel a sense of belonging toward the KS community 2. I have the feeling of togetherness or closeness in KS community 3. I have a strong positive feeling toward the KS community 4. I am proud to be a member of the KS community
SIT[a]	1. I maintain close social relationships with some members in the KS community 2. I spend a lot of time interacting with some members in the KS community 3. I know some members in the KS community on a personal level 4. I have frequent communication with some members in the KS community
KS[a]	1. Number of times visit KS SNS per week 2. Number of hours spent on KS SNS per time
MIL[d]	1. I understand my life's meaning 2. I am looking for something that makes my life feel meaningful 3. I am always looking to find my life's purpose 4. My life has a clear sense of purpose 5. I have a good sense of what makes my life meaningful 6. I have discovered a satisfying life purpose 7. I am always searching for something that makes my life feel significant 8. I am seeking a purpose or mission for my life 9. I am searching for meaning in my life

Notes: ER, expected relationship; Al, altruism; SV, shared vision; CI, community identification; SIT, social interaction ties; KS, knowledge sharing; MIL, meaning in life. [a]Chiu *et al.* (2006); [b]Wasko and Faraj (2005); [c]Hsu and Lin (2008); [d]Steger *et al.* (2006)

Table AI.
Items of questionnaire

Appendix 2. Follow-up interview questions

For the computer instructor who shared his observations and teaching experiences:

(1) Demographic data.

(2) Which kind of computer-related courses had been taken?

(3) Most frequently used SNSs.

(4) On average, the length of time spent using SNSs each day.

(5) The major source of friends on the SNSs.

(6) The frequency of contact between friends on SNSs.

(7) The preferred kinds of information shared on SNSs.

(8) The motivations for sharing information on SNSs.

(9) The results or benefits that follow knowledge sharing on SNSs.

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